STATEMENT OF ROBERT A. MALONE
ON BEHALF OF KENNECOTT
BEFORE THE ENVIRONMENTAL PROTECTION AGENCY
MINE WASTE REPORT HEARING
WASHINGTON, D.C.
March 11, 1986

I am Bob Malone, Director of Environmental Affairs for Kennecott in Salt Lake City, Utah. We appreciate the opportunity to be here and provide comments on EPA's Mine Waste Study.

Kennecott is one of the Nation's largest producers of copper and at full production accounts for 23 percent of the Nation's newly mined copper each year. We also operate in other areas of metal mining, including gold, silver, lead, zinc, and molybdenum. We plan to submit detailed comments, so I will confine my testimony to a few points, which I would like to illustrate with some slides. We hope these first slides convey a sense of the enormous quantities of wastes generated at mining sites.

Slide 1

BINGHAM CANYON MINE NEAR SALT LAKE CITY

Kennecott's Bingham Mine in Utah is the world's largest man-made excavation. It covers 1,900 acres. The mine is over 2.3 miles wide and over 1/2 mile deep. It has

been mined as an open pit since 1904. Since then, over 4.8 billion tons of material have been removed from the mine and the average copper content of that material was less than 0.6 percent copper or 12 pounds per ton. So more than 99.4 percent of that 4.8 billion tons of material is potentially mine waste with which this hearing is concerned. Kennecott also operates open pit copper mines in Arizona and New Mexico. The total material that has been removed from all these mines amounts to more than 7 billion tons. At full production Kennecott moves approximately 500,000 tons of material per day. The Mine Waste Report fails to deal adequately with the many ways in which RCRA regulations designed to deal with small volumes of waste are inappropriate for the huge volumes of waste involved in open pit copper mining.

Slide 2

PARTIAL VIEW -- UTAH MINE WASTE DUMPS

The material shown here is overburden (rock and earth containing little or no copper) that must be moved to access the ore. It is blasted from the sides of the pit, where it is loaded by huge electric shovels into 150-ton trucks, that haul it to overburden dumps. Such dumps at Kennecott's three copper divisions cover 2,585 acres and

contain 1.47 billion tons of inert material, similar to the ground that it covers.

Slide 3

PARTIAL VIEW -- UTAH MINE LEACH DUMPS

This dump is similar to the overburden we were just looking at, with the difference that it contains a small amount of copper. Not enough for processing as ore, but enough to be worth recovering by leaching. As water is trickled through the material, a mild acidic solution is formed and copper is leached from the material. The copper-laden solution is collected and processed in a precipitation plant. The precipitate is approximately 80 percent pure copper metal. Leach dumps at Kennecott's three copper divisions cover 4,740 acres and contain more than 2 billion tons of material. Leach dumps are an important part of our process streams and produce 14 percent of our copper.

Slide 4

5,000-ACRE UTAH COPPER DIVISION TAILINGS POND

The material from the mine which doesn't go to waste or leach dumps is called ore and goes to a concentrator. There,

the ore is crushed and ground to a consistency approximating very fine sand. The copper is removed by a flotation process and goes on to the smelter as "concentrate." Waste from the concentration process, called "tailings," are slurried to a nearby pond.

Tailings have been stored in ponds since 1907. One of our tailing areas covers more than 5,600 acres and is 110 feet high. More than 1.3 billion tons of material have been impounded in the area. Water discharged from the pond is covered by an NPDES permit, but the bulk of the water is recycled back to the concentrators.

Kennecott's total tailings cover 8,600 acres and contain more than 2 billion tons. Requirements for capping and lining are not economically or technologically feasible for tailings ponds.

My comments today stress three key points. First, mining companies use integrated waste management practices. Thus, information only on segregated wastes exaggerates the risks from mining sites. Second, EPA cannot use chemical composition alone to assess the risks from mining waste. EPA must also show whether hazardous constituents are actually released from mining waste and, if so, whether the public is likely to be exposed to them. Finally, uniform technical standards cannot be applied effectively across-the-board to

mining waste. Instead, if regulation is warranted, design requirements should be tailored for each site.

Since 1980, Congress has wanted EPA to conduct "a detailed and comprehensive study on mining waste." Congress was concerned that EPA lacked sufficient information on the environmental effects from mining waste to begin a regulatory program for the mining industry. During the past six years, EPA has obviously tried to assemble good data. For example, EPA has improved its chemical composition data base. Although Kennecott questions the labeling of leach liquors as a waste, we nonetheless appreciate EPA's significant effort to analyze the wastes described in the study.

In looking at our operation and at EPA's study, we see three major areas where more information is critical. First, the site specific aspects of mine waste. Second, the extent to which mining wastes are commingled must be examined. Third, the risk of exposure to the waste's hazardous constituents must be calculated. Let's look at each issue in some detail.

Slide 5

SITE SPECIFIC ASPECTS

Not only are the amounts of waste vast, but the differences between wastes at mines are considerable. The wastes differ between properties according to (1) the geology of the ore body (e.g., chemical composition and grade of the ore body, nature and extent of impurities, type and amount of overburden, etc.), (2) other site-specific circumstances (e.g., presence and depth of aquifers, amount, type and seasonal pattern of precipitation, proximity to human settlements, etc.), and (3) mine technology (e.g., beneficiation processes and reagents used, type and characteristics of leaching operations, etc.). All of these factors are relevant to the amount and characteristics of the mine wastes and possible environmental impacts associated with them, and they need to be studied on a site-specific basis. The Mine Waste Report fails to deal with this problem adequately.

Slide 6

UTAH COPPER DIVISION
CONCENTRATING, SMELTING AND REFINING
WASTE STREAMS

It is unfortunate that EPA considered only individual wastes. Mining wastes are often commingled. In many

cases this practice offsets the adverse effects that an individual waste may have on the environment. For example, acid plant blowdown is added to concentrator tailings at some operations. The buffering capacity of the tailings slurry neutralizes the acid plant blowdown and precipitates the dissolved metals. This practice of using tailings slurry to treat acid plant blowdown is an environmentally satisfactory method of waste disposal.

Another consequence of EPA's failure to recognize that mining wastes are commingled concerns the proposal to list leach liquor as a hazardous waste. Because of the Agency's RCRA mixture and "derived from" rules, these proposals would make every part of an integrated copper producing operation a hazardous waste facility. Leach dump liquor goes to a precipitation plant and precipitates from that plant go to the smelter. Smelter gas goes to acid plants, which produce blowdown sludge which goes to a water treatment plant. Water from that plant goes to the tailings pond and to the concentrator facilities where the ore is first processed. Slag from the smelter goes to the tailings pond and copper goes to refineries where the copper is further purified and byproducts such as gold and silver are removed. If the "derived from" rule of RCRA applies, all

of these facilities are treating hazardous waste or its derivatives and even our products -- copper, gold and silver -- may be hazardous wastes, subject to containment, labeling and manifesting requirements. The Mine Waste Report makes no mention of this problem which requires extensive study if RCRA regulations are to be applied to the copper mining industry.

Of greater concern, however, is the scant information in the study on fate and transport of hazardous constituents from mining sites to the environment. The study presents no data that hazardous constituents from mining sites are contaminating groundwater. The study presents only limited information on the migration of <u>non-hazardous</u> constituents to groundwater. The study also fails to indicate whether these non-hazardous constituents migrate sufficient distances to expose the public or other lifeforms. Absent information on who or what is being exposed to <u>hazardous</u> constituents, EPA has not answered the key question asked by Congress: Does mining waste adversely affect human health and the environment?

In all fairness, Congress gave EPA a very difficult task. Because wastes and hydrogeology differ significantly from mining site to mining site, it is inconceivable to me that EPA could have gathered sufficient data to accurately characterize the environmental risks from the entire mining

industry. Data generated at a particular site can speak only for the hazards posed at that site.

We understand EPA's difficulties because Kennecott has conducted its own environmental assessment of the mine shown earlier in these slides. In June of 1983, Kennecott launched a five-year program to investigate the impact of its Bingham Canyon copper mine on groundwater down gradient from the Bingham Canyon. The study area covers 200 square miles. The initial investigation involves water sampling and analysis from 51 Kennecott monitoring wells, 64 private wells, and 30 surface water sites. Numerous additional monitoring wells will be required before the study is completed.

Kennecott had two goals in mind when designing the study. First, to evaluate the extent and seriousness of any groundwater contamination. Second, to identify potential cost-effective cleanup measures.

It has taken Kennecott almost two-and-a-half years to gather the data needed to build a model for simulating groundwater flow in the study area. With the model in place, Kennecott will be able to pinpoint sources of contamination. This, in turn, will allow us to better define the extent of the contamination and identify possible solutions.

Conducting this study has not been easy. Generally, two aquifers exist in the study area. The deep aquifer is of

particular concern to Kennecott because it is used as a community water supply. Thus far, we have learned that metals from the mine have reached the shallow aquifer and, to a lesser extent, the deep aquifer. The contamination appears to be localized with relatively slow migration in the aquifer. We are now gathering additional data to identify the sources of contamination. Where we know that a particular operation can potentially contaminate groundwater, Kennecott has already taken remedial steps.

Slide 7

UTAH COPPER DIVISION EAST SIDE DISTRIBUTION AND COLLECTION SYSTEM

For example, Kennecott has constructed a state-of-the-art leach liquor collection system which is composed of concrete barrier walls cut to bedrock, lined collection channels and concrete lined canals.

As part of our five-year effort, Kennecott is also examining different ways to reduce the volume of storm water that comes into contact with the active mine areas. Diverting excess surface water from these areas is one cost-effective way to address groundwater contamination at our operation. It is significant to note that the use of liners or caps, as

described in EPA's Mine Waste Study, is not among the alternatives Kennecott is exploring. There are several technical and practical reasons why liners and caps are inappropriate for mining waste. Rather than go into detail here, these reasons will be presented in Kennecott's written comments on EPA's study.

Perhaps the most valuable lesson Kennecott has learned is that a generic study, no matter how well designed and conducted, cannot serve as the basis for developing a regulatory program for mining waste. Laying aside our problems with the underlying data, we find that all four regulatory scenarios in EPA's study contain technical standards that are either infeasible or ineffective to address contamination problems at mining sites.

Slide 8

AVERAGE COST IMPACTS ON COPPER INDUSTRY
(EPA ESTIMATES)

First, take the cost involved. The Charles River Associates cost analyses relied on by the Mine Waste Report estimate average RCRA regulatory compliance costs for the copper industry ranging from 10 cents to 80 cents per pound for a commodity which sells on the international market for

about 65 cents per pound. (We have, in fact, applied the CRA methodology to our facilities and calculated costs significantly higher than those reported by CRA for the entire industry -- casting further doubt on the adequacy of the cost models. Our written comments will explain this in detail.)

A great deal more study is needed to determine whether there is any way to regulate copper mine waste economically under RCRA. Creation of vast volumes of waste materials will continue as long as copper is mined, which we hope means for many years into the future. Without such large scale operations copper cannot be produced at prices competitive in the world market. It is important to remember that the industry cannot raise prices in an attempt to pass along these costs to the consumers. Copper prices are determined by the world supply/demand balance and not set unilaterally by U.S. producers. If we cannot compete in the world market, we can no longer engage in mining activities. If we are to continue mining, we must deal with mine waste at a feasible cost, and much more study is needed on this subject than the Mine Waste Study provides.

Also disturbing is EPA's failure to recognize that each mine is so different that design requirements must be tailored for each site. EPA should postpone a decision to regulate mining waste until it has a better understanding of

management practices at mining sites to design effective regulations.

Slide 9

CONCLUSIONS

Our written comments will expand on what I've said here today and also will present our further views of the Mine Waste Study, which may be summarized as follows:

I. The statute requires EPA to conduct a "detailed and comprehensive" study as a prerequisite for determining whether mining waste should be regulated under Subtitle C of RCRA.

II. EPA has made a good start, but it has not submitted a comprehensive study to Congress.

III. Absent a comprehensive study, EPA cannot decide to regulate mining waste under Subtitle C.

IV. EPA must conduct further study to better define the problem if a sensible regulatory approach is to be developed.

Kennecott is committed to the goal of realistic and environmentally sound regulation. We would be glad to provide the Agency with the results from our Bingham Canyon Study. Hopefully, our study will convince EPA of the detailed and comprehensive information needed to make even an initial decision to regulate mining waste.

Thank you.

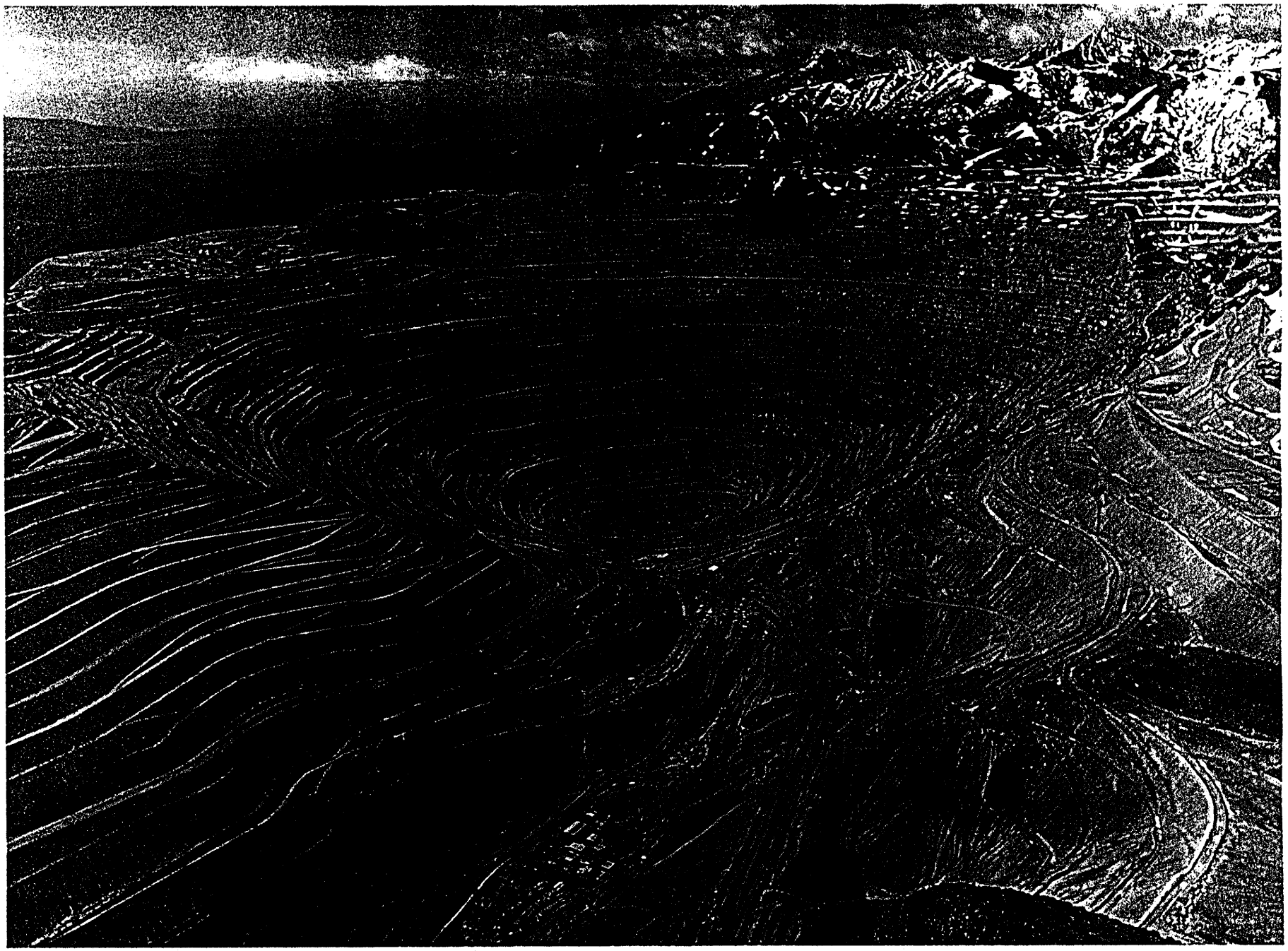


Photo 1 Bingham Canyon Mine near Salt Lake City

Photo 2 Partial View - Utah Mine Waste Dumps

Photo 3 Partial View - Utah Mine Leach Dumps

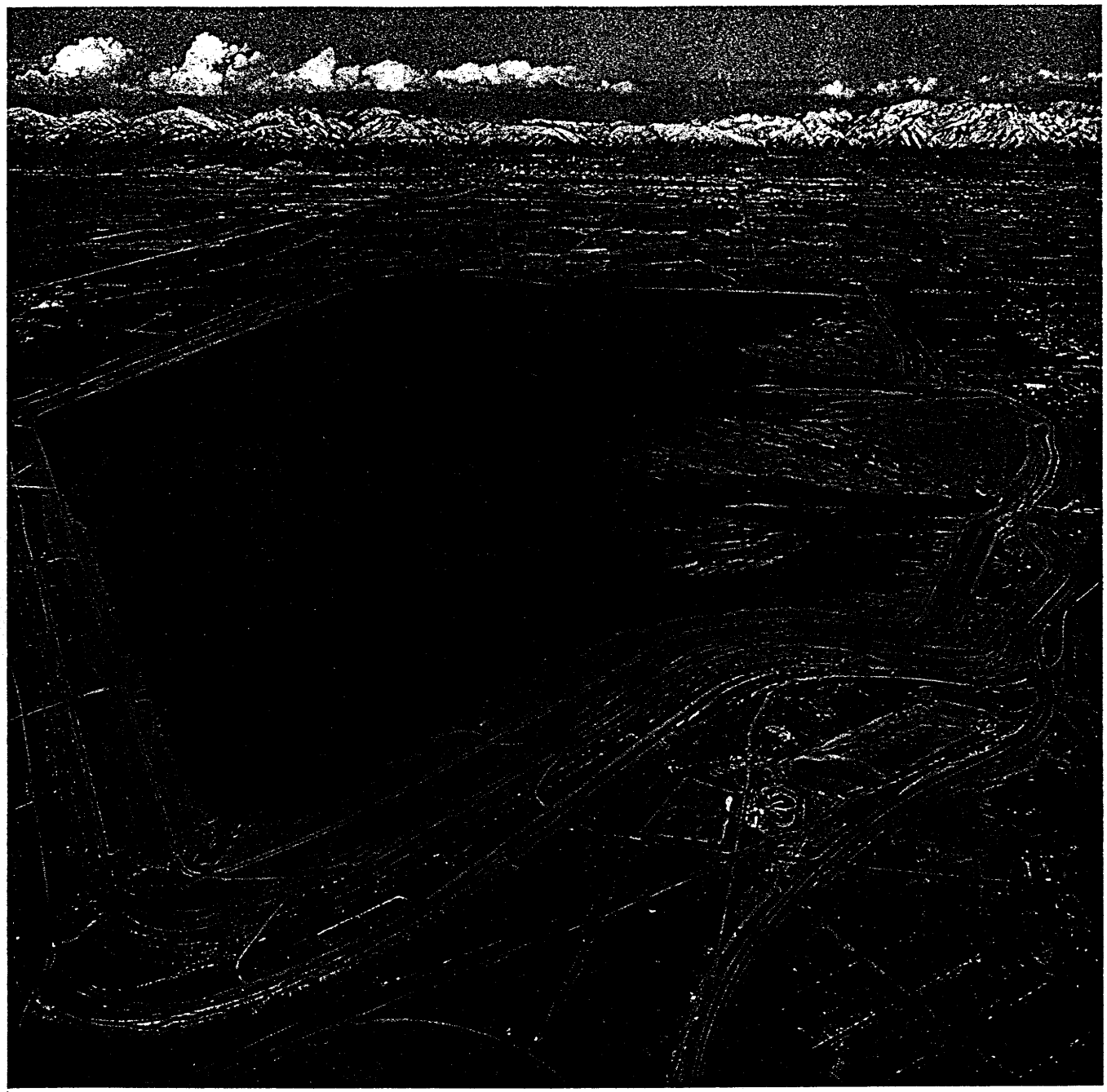


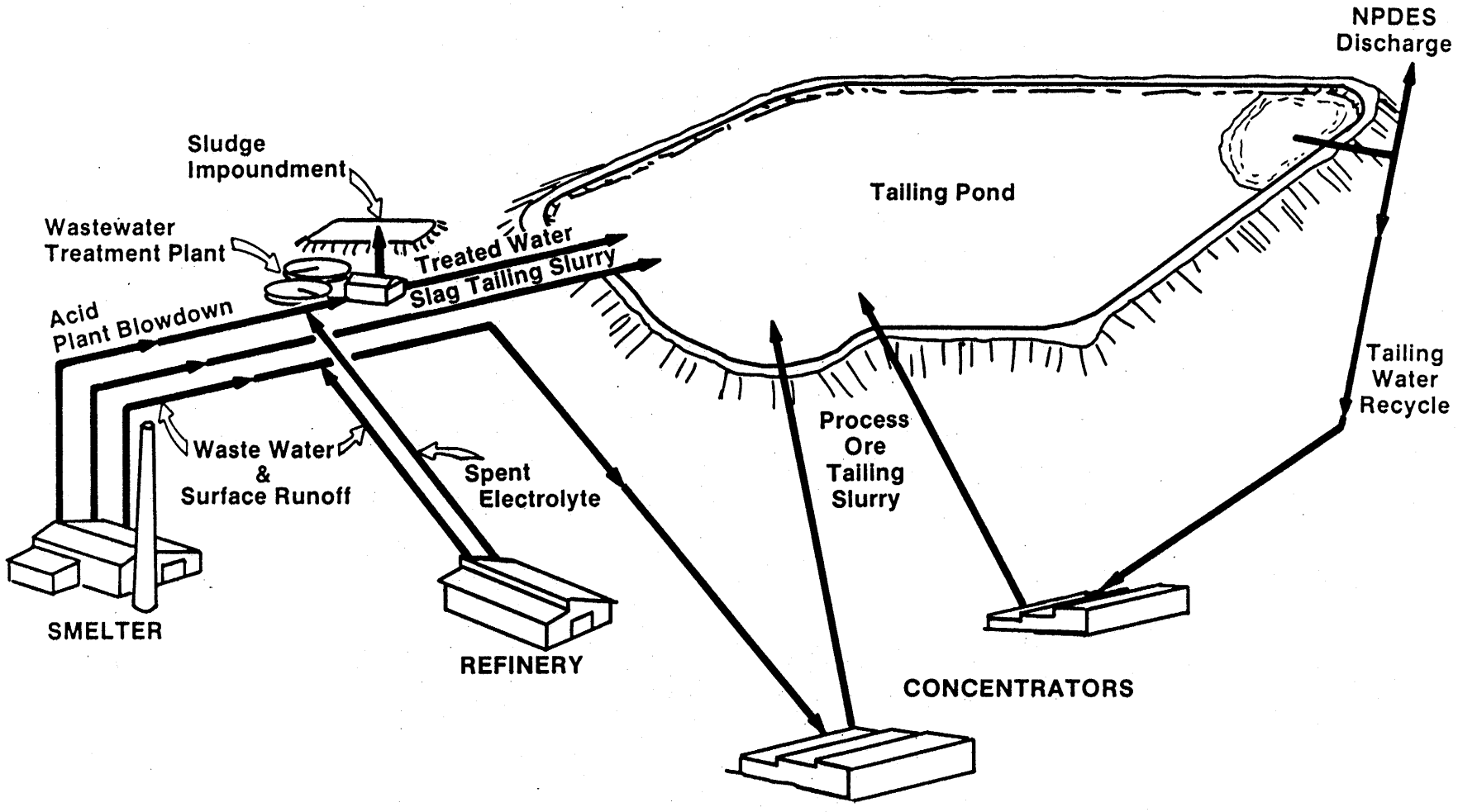
Photo 4 5,000-Acre Utah Copper Division Tailings Pond

SITE SPECIFIC ASPECTS

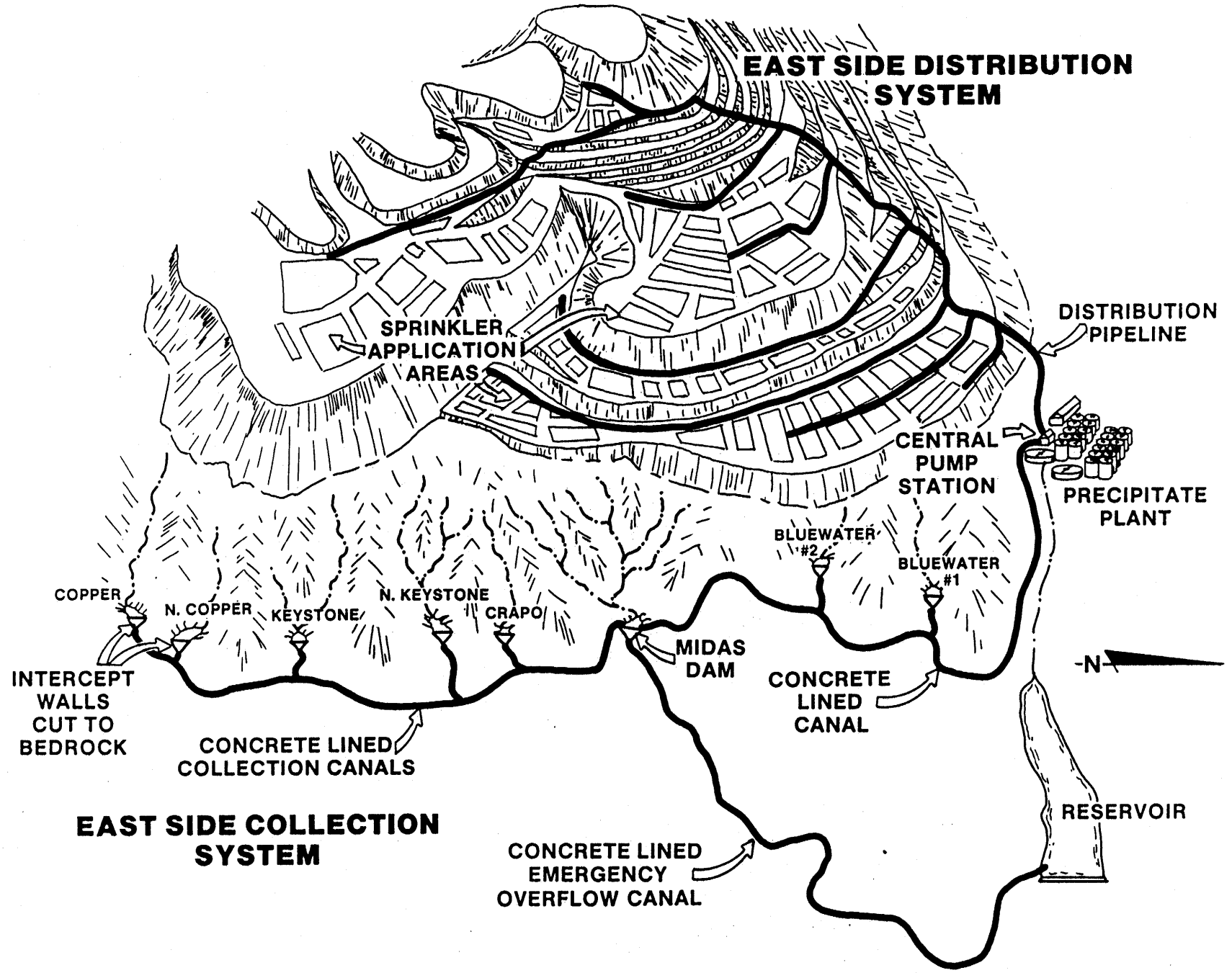
- Vast Volumes and Areas
- Ore Body Geology
  - Chemical Composition
  - Ore Grade
  - Nature of Impurities
  - Type of Overburden
- Presence of Aquifers
- Climate
- Proximity to Human Populations
- Mine Technology

UTAH COPPER DIVISION

CONCENTRATING, SMELTING AND REFINING WASTE STREAMS



UTAH COPPER DIVISION



AVERAGE COST IMPACTS ON COPPER INDUSTRY
EPA ESTIMATES

Cost	Subtitle C		Tailored Standards	
	1A	1B	2A	2B
Lifetime ($ Million)	1,400	8,300	400	2,400
Annualized Costs ($ Million)	110	740	14	150
Average Cost (¢/Lb Copper)	**80**	**55**	**10**	**11**

CONCLUSIONS

- The Statute Requires EPA to Conduct a "Detailed and Comprehensive" Study - Prerequisite for Determining Regulation Under Subtitle C

- EPA Has Made a Good Start but Has Not Submitted a Comprehensive Study to Congress

- Absent a Comprehensive Study, EPA Cannot Decide to Regulate Mine Waste Under Subtitle C

- EPA Must Conduct Further Studies to Define the Problem if a Sensible Regulatory Approach is to be Developed

KENNECOTT COPPER OPERATIONS STATISTICS

Operation	Mine	Overburden	Leach Dumps	Tailing Pond
Utah Copper Division	1408 Acres 2.2 Sq. Miles 2640 Ft Deep	1985 Acres 3.1 Sq Miles 1400 MM Tons	2110 Acres 3.3 Sq. Miles 1500 MM Tons	5500 Acres 8.6 Sq. Miles 1440 MM Tons
Chino Mines Company	1200 Acres 1.9 Sq. Miles 1200 Ft Deep	400 Acres 0.6 Sq Miles 43 MM Tons	1450 Acres 2.3 Sq. Miles 880 MM Tons	2200 Acres 3.4 Sq. Miles 355 MM Tons
Ray Mines Division	960 Acres 1.5 Sq. Miles 1200 Ft Deep	200 Acres 0.3 Sq. Miles 30 MM Tons	1180 Acres 1.8 Sq. Miles 674 MM Tons	900 Acres 1.4 Sq. Miles 250 MM Tons